

What is claimed is:

1. A lipid system comprising alpha-linolenic acid (C18:3n-3), omega-6 fatty acids, and omega-9 fatty acids wherein
the ratio of said omega-6 fatty acids to said alpha-linolenic acid (C18:3n-3) is from about
5 0.25:1 to about 3:1, and
the ratio of said omega-9 fatty acids to said alpha-linolenic acid (C18:3n-3) is from about
0.4:1 to about 3:1.
2. The lipid system as defined in claim 1 wherein the ratio of said omega-6 fatty acids to said alpha-linolenic acid (C18:3n-3) is from about 0.3:1 to about 2.5:1.
- 10 3. The lipid system as defined in claim 1 wherein the ratio of said omega-9 fatty acids to said alpha-linolenic acid (C18:3n-3) is from about 1:1 to about 3:1.
4. The lipid system as defined in claim 1 further comprising saturated fatty acids with more than 12 carbon atoms, wherein said saturated fatty acids are present in an amount less than about 47 gm per 100 gm lipid.
- 15 5. The lipid system as defined in claim 1 wherein said omega-6 fatty acid is selected from the group consisting of linoleic acid (C18:2n-6), gamma-linolenic acid (C18:3n-6), eicosadienoic acid (C20:2n-6), arachidonic acid (C20:4n-6), di-homo-gamma-linolenic acid (C20:3n-6), and combinations thereof.
- 20 6. The lipid system as defined in claim 1 wherein said omega-9 fatty acid is selected from the group consisting of oleic acid (C18:1n-9), elaidic acid (C18:1n-9), eicosenoic acid (C20:1n-9), erucic acid (C22:1n-9), and nervonic acid (C24:1n-9), and combinations thereof.
- 25 7. The lipid system as defined in claim 1 comprising from about 17 to about 54% alpha-linolenic acid (C18:3n-3), from about 17 to about 21% linoleic acid (C18:2n-6), from about 19 to about 52% oleic acid (C18:1n-9), and less than about 47% saturated fatty acids, based on the total weight of the lipid system.
8. The lipid system as defined in claim 1 comprising from about 30 to about 90% flaxseed oil, from about 0 to about 59% high oleic safflower oil, and from about 0 to about 7% corn oil.

9. A product comprising the lipid system of claim 1 wherein said product is selected from the group consisting of a liquid nutritional product, a solid nutritional product, a semi-solid nutritional product, a product provided as an emulsion, a nutritional product provided as a powder, and a product provided as a soft gelatin capsule.
- 5 10. A method for improving the glucose tolerance of a glucose intolerant individual comprising administering the lipid system of claim 1.
11. A method for improving the insulin sensitivity of an insulin resistant individual comprising administering the lipid system of claim 1.
- 10 12. A method for reducing the risk of vascular disease in an individual at risk for vascular disease comprising administering the lipid system of claim 1.
13. A method for providing nutrition to an individual comprising administering the nutritional product of claim 9.
14. A nutritional product comprising:
- 15 a) a lipid system comprising alpha-linolenic acid (C18:3n-3), omega-6 fatty acids, and omega-9 fatty acids wherein
- i) the ratio of said omega-6 fatty acids to said alpha-linolenic acid (C18:3n-3) is between 0.25:1 and 3:1, and
- ii) the ratio of said omega-9 fatty acids to said alpha-linolenic acid (C18:3n-3) is between 0.4:1 and 3:1; and
- 20 b) a protein component providing from about 5 to about 35% of the total caloric content, a carbohydrate component providing from about 10 to about 95% of the total caloric content, and a lipid component providing from about 5 to about 70% of the total caloric content.
15. The nutritional product as defined in claim 14 wherein the ratio of said omega-6 fatty acids to said alpha-linolenic acid (C18:3n-3) is from about 0.3:1 to about 2.5:1.
- 25 16. The nutritional product as defined in claim 14 wherein the ratio of said omega-9 fatty acids to said alpha-linolenic acid (C18:3n-3) is from about 1:1 to about 3:1.
17. The nutritional product as defined in claim 14 further comprising saturated fatty acids with more than 12 carbon atoms, wherein said saturated fatty acids are present in an amount less than 47 g per 100 g lipid.

18. The nutritional product as defined in claim 14 wherein said omega-6 fatty acid is selected from the group consisting of linoleic acid (C18:2n-6), gamma-linolenic acid (C18:3n-6), eicosadienoic acid (C20:2n-6), arachidonic acid (C20:4n-6), di-homo-gamma-linolenic acid (C20:3n-6), and combinations thereof and wherein said omega-9 fatty acid is selected from the group consisting of oleic acid (C18:1n-9), elaidic acid (C18:1n-9), eicosenoic acid (C20:1n-9), erucic acid (C22:1n-9), and nervonic acid (C24:1n-9), and combinations thereof.
19. The nutritional product as defined in claim 14 comprising from about 17 to about 54% alpha-linolenic acid (C18:3n-3), from about 17 to about 21% linoleic acid (C18:2n-6), from about 19 to about 52% oleic acid (18:1n-9), and less than about 47% saturated fatty acids.
20. The nutritional product as defined in claim 14 comprising from about 30 to about 90% flaxseed oil, from about 0 to about 59% high oleic safflower oil and from about 0 to about 7% corn oil.
21. A method for improving the glucose tolerance of a glucose intolerant individual comprising administering the nutritional product of claim 14.
22. A method for improving the insulin sensitivity of an insulin resistant individual comprising administering the nutritional product of claim 14.
23. A method for reducing the risk of vascular disease in an individual at risk for vascular disease comprising administering the nutritional product of claim 14.
24. A method for providing nutrition to an individual comprising administering the nutritional product of claim 14.
25. A method for improving the glucose tolerance of a glucose intolerant individual comprising administering a lipid system to said glucose intolerant individual, said lipid system comprising omega-3 fatty acids, omega-6 fatty acids, and omega-9 fatty acids wherein the ratio of said omega-6 fatty acids to said omega-3 fatty acids is between 0.25:1 and 3:1; and the ratio of said omega-9 fatty acids to said omega-3 fatty acids is between 0.4:1 and 3:1.
26. The method as defined in claim 25 wherein the ratio of said omega-6 fatty acids to said omega-3 fatty acids is between 0.3:1 and 2.5:1.

27. The method as defined in claim 25 wherein the ratio of said omega-9 fatty acids to said omega-3 fatty acids is between 1:1 and 3:1.

28. The method as defined in claim 25 wherein said omega-3 fatty acid is selected from the group consisting of alpha-linolenic acid (C18:3n-3), stearidonic acid (C18:4n-3),

5 eicosapentaenoic acid (C20:5n-3), docosapentaenoic acid (C22:5n-3), docosahexaenoic acid (C22:6n-3), and combinations thereof, and wherein said omega-6 fatty acid is selected from the group consisting of linoleic acid (C18:2n-6), gamma-linolenic acid (C18:3n-6), eicosadienoic acid (C20:2n-6), arachidonic acid (C20:4n-6), di-homo-gamma-linolenic acid (C20:3n-6), and combinations thereof, and wherein said omega-9 fatty acid is selected from the group consisting of oleic acid (C18:1n-9), elaidic acid (C18:1n-9), eicosenoic acid (C20:1n-9), erucic acid (C22:1n-9), and nervonic acid (C24:1n-9), and combinations thereof.

29. The method as defined in claim 25 wherein said lipid system comprises from about 17 to about 54% alpha-linolenic acid (C18:3n-3), from about 17 to about 21% linoleic acid (C18:2n-6), from about 19 to about 52% oleic acid (C18:1n-9), and less than about 47% saturated fatty acids.

30. The method as defined in claim 25 wherein said lipid system comprises from about 30 to about 90% flaxseed oil, from about 0 to about 59% high oleic safflower oil and from about 0 to about 7% corn oil.

31. A method for improving the insulin sensitivity of an insulin resistant individual comprising administering a lipid system to said insulin resistant individual, said lipid system comprising omega-3 fatty acids, omega-6 fatty acids, and omega-9 fatty acids wherein

the ratio of said omega-6 fatty acids to said omega-3 fatty acids is between 0.25:1 and 3:1; and

the ratio of said omega-9 fatty acids to said omega-3 fatty acids is between 0.4:1 and 3:1.

32. The method as defined in claim 31 wherein the ratio of said omega-6 fatty acids to said omega-3 fatty acids is between 0.3:1 and 2.5:1.

33. The method as defined in claim 31 wherein the ratio of said omega-9 fatty acids to said omega-3 fatty acids is between 1:1 and 3:1.

34. The method as defined in claim 31 wherein said omega-3 fatty acid is selected from the group consisting of alpha-linolenic acid (C18:3n-3), stearidonic acid (C18:4n-3), eicosapentaenoic acid (C20:5n-3), docosapentaenoic acid (C22:5n-3), docosahexaenoic acid (C22:6n-3), and combinations thereof and wherein said omega-6 fatty acid is selected from the group consisting of linoleic acid (C18:2n-6), gamma-linolenic acid (C18:3n-6), eicosadienoic acid (C20:2n-6), arachidonic acid (C20:4n-6), di-homo-gamma-linolenic acid (C20:3n-6), and combinations thereof and wherein said omega-9 fatty acid is selected from the group consisting of oleic acid (C18:1n-9), elaidic acid (C18:1n-9), eicosenoic acid (C20:1n-9), erucic acid (C22:1n-9), and nervonic acid (C24:1n-9), and combinations thereof.
35. The method as defined in claim 31 wherein said lipid system comprises from about 17 to about 54% alpha-linolenic acid (C18:3n-3), from about 17 to about 21% linoleic acid (C18:2n-6), from about 19 to about 52% oleic acid (C18:1n-9), and less than about 47% saturated fatty acids.
36. The method as defined in claim 31 wherein said lipid system comprises from about 30 to about 90% flaxseed oil, from about 0 to about 59% high oleic safflower oil, from about 0 to about 7% corn oil, and from about 0 to about 7% soy lecithin.
37. A method for reducing the risk of vascular disease in an individual at risk for vascular disease comprising administering a lipid system to said individual at risk for vascular disease, said lipid system comprising omega-3 fatty acids, omega-6 fatty acids, and omega-9 fatty acids wherein
the ratio of said omega-6 fatty acids to said omega-3 fatty acids is between 0.25:1 and 3:1; and
the ratio of said omega-9 fatty acids to said omega-3 fatty acids is between 0.4:1 and 3:1.
38. The method as defined in claim 37 wherein the ratio of said omega-6 fatty acids to said omega-3 fatty acids is between 0.3:1 and 2.5:1.
39. The method as defined in claim 37 wherein the ratio of said omega-9 fatty acids to said omega-3 fatty acids is between 1:1 and 3:1.
40. The method as defined in claim 37 wherein said omega-3 fatty acid is selected from the group consisting of alpha-linolenic acid (C18:3n-3), stearidonic acid (C18:4n-3),

eicosapentaenoic acid (C20:5n-3), docosapentaenoic acid (C22:5n-3), docosahexaenoic acid (C22:6n-3), and combinations thereof and wherein said omega-6 fatty acid is selected from the group consisting of linoleic acid (C18:2n-6), gamma-linolenic acid (C18:3n-6), eicosadienoic acid (C20:2n-6), arachidonic acid (C20:4n-6), di-homo-gamma-linolenic acid (C20:3n-6), and combinations thereof and wherein said omega-9 fatty acid is selected from the group consisting of oleic acid (C18:1n-9), elaidic acid (C18:1n-9), eicosenoic acid (C20:1n-9), erucic acid (C22:1n-9), and nervonic acid (C24:1n-9), and combinations thereof.

41. The method as defined in claim 37 wherein said lipid system comprises from about 17 to about 54% alpha-linolenic acid (C18:3n-3), from about 17 to about 21% linoleic acid (C18:2n-6), from about 19 to about 52% oleic acid (C18:1n-9), and less than about 47% saturated fatty acids.

42. The method as defined in claim 37 wherein said lipid system comprises from about 30 to about 90% flaxseed oil, from about 0 to about 59% high oleic safflower oil and from about 0 to about 7% corn oil.

43. The method as defined in claim 37 wherein said risk of vascular disease is impaired vascular function.

44. The method as defined in claim 43 wherein said impaired vascular function is selected from the group consisting of impaired vasodilation, reduced blood flow, and high blood pressure.

45. The method as defined in claim 43 wherein said risk of vascular disease is elevated blood lipid levels.